

A new approach for the homogenization of three-dimensional metallo-dielectric lattices : the periodic unfolding method

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In this presentation the classical multi-scale homogenization technique is associated to a new approach for the computation of the effective constitutive parameters of three-dimensional metallo-dielectric lattices. This approach is the periodic unfolding method [1, 2]. It is based on the decomposition of the fields in a main macroscopic part without micro-oscillations, and a corrector taking these micro-oscillations into account. To demonstrate the effectiveness of the proposed method, the effective permittivity for lattices of dielectric cubes and rods are compared to those obtained by the Maxwell-Garnett method. The corrector fields are also computed and studied as a function of frequency.

- [1] Bossavit A., Griso G., Miara B., *Modélisation de structures électromagnétiques périodiques. Matériaux bianisotropes avec mémoire*. C. R. Acad. Sci. Paris, Ser. I 338, 97-102 (2004).
- [2] Cioranescu D., Damlamian A., Griso G., *Periodic unfolding and homogenization*, C. R. Acad. Sci. Paris, Ser. I 335, 99-104 (2002).